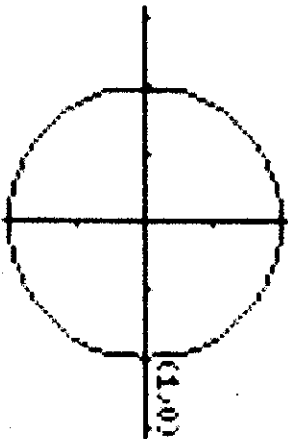


Bug on a Circular Track

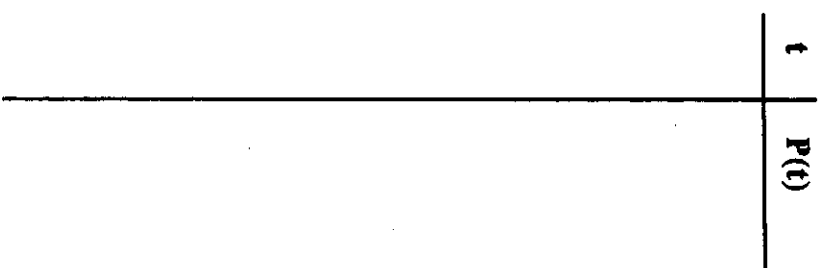
An Introduction to Trigonometry - A Unit Circle Approach

Suppose a bug travels counterclockwise around a circular track as shown. Assume the bug begins at the point $(1,0)$ and walks t units along the circle, carefully staying on the track. Let $P(t)$ be the point (x,y) on the circle which is the location of the bug after it has walked exactly t units from $(1,0)$, travelling counterclockwise.

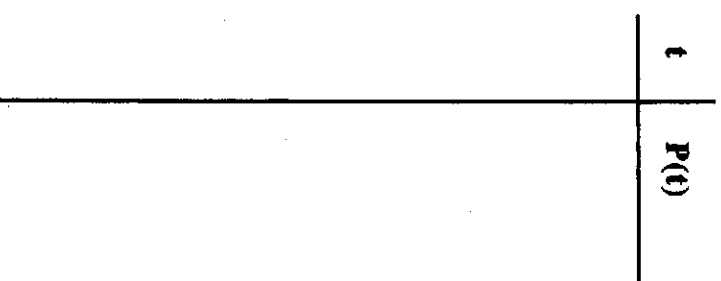
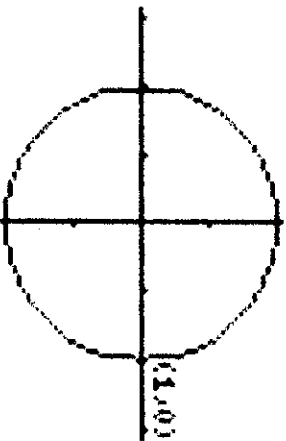


Equation of the Circle: _____

Circumference of Circle: _____



Let's find some more important values for our chart. Use the unit circle below.



Definitions:

The x-coordinate of the location point $P(t)$ is defined to be the cosine of t , written $\cos(t)$.

The y-coordinate of the location point $P(t)$ is defined to be the sine of t , written $\sin(t)$.

Find the following:

1. $\cos \pi$

4. $\sin\left(\frac{\pi}{6}\right)$

2. $\sin\left(-\frac{\pi}{2}\right)$

5. $\cos\left(\frac{23\pi}{6}\right)$

3. $\cos\left(\frac{5\pi}{4}\right)$

6. $\sin\left(\frac{7\pi}{2}\right)$

We also have defined:

$$\sec \theta = \frac{1}{\cos \theta}, \quad \csc \theta = \frac{1}{\sin \theta}, \quad \tan \theta = \frac{\sin \theta}{\cos \theta}, \quad \text{and} \quad \cot \theta = \frac{\cos \theta}{\sin \theta}$$

Find the following:

7. $\csc(-3\pi)$

8. $\tan\left(\frac{2\pi}{3}\right)$

9. $\sec\left(\frac{-5\pi}{4}\right)$

10. $\cot\left(\frac{3\pi}{2}\right)$